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GENERA
OF
✓ EUROPEAN AND NORTHAMERICAN
✓ BRYINEÆ
(MOSES)

SYNOPTICALLY DISPOSED

BY
N. C. KINDBERG.



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GÖTEBORG
D. F. BONNIERS BOKTRYCKERI AKTIEBOLAG
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PREFACE.

The present treatise is an introduction to a synoptical Moss-Flora of Europe and N. America, ready as manuscript.

It is an essay to define all here belonging genera of Bryineæ and to dispose themselves in natural families with attention also to exotic genera and species. To clear their natural affinity I have often found that the common habit (»habitus») of the plants indicates the place in the system; it is also a »criterium« not to depreciate.

To state »a priori» the vegetable organs, of which the characters are to be chosen, does not agree with nature. There are to be found in a certain genus constant characters, which in another are very variable. »Character non dabit speciem, sed species characterem».

Recent bryologists have attached too great an importance to the organisation of the peristome. The exostome (the outer or the simple peristome) is in many genera, also in individuals, variable. The endostome of the capsule gives indeed good constant characters also in exotic, by the author examined genera and species.

Sterile specimens, so often occurring, ought not to be neglected. A trained bryologist, well-intimate with the organisation of the moss-leaves, can sometimes find new species, as well characterized, as if the specimens were fertile.

The author was beginning his bryological studies in Sweden already 1851; bryology was his speciality 1879.

I have made longer travels for this purpose also in Norway (9 summers in the alpine district), in the Pyrenees 1855, in northern Italy 1888, in the Switzerland 1888, 1889, 1892 and 1895, also several times in Germany.

My collections have been augmented by contributions from many bryologists. Many typical specimens, collected by Austin, Berggren, Bottini, Breidler, Brotherus, Cardot, Drummond, Hartman, Howe, James, Lesquereux, Levier, Lindberg, Lorentz, Milde, Philibert, Renaud, Roell, Schimper, Sullivan, Venturi, Zetterstedt and others, have been very useful.

I have also received larger collections by D:r C. Mueller (mostly exotic species), Mr J. Husnot (*Musci Galliae*), the Rev:d A. C. Waghorne (about 1,000 specimens from Labrador and N. Foundland), D:r V. F. Brotherus (mostly from Finland), D:r E. Levier (from Spain and Portugal), Mr J. M. Macoun (from Alaska), D:r T. Heldreich (from Greece), Prof. J. Arcangeli (from Italy), Messrs G. A. Holt and T. Rogers (from Britain), D:r R. Gyllencreutz (from Spetsbergen).

I wish therefore to thank sincerely my friends and correspondents for valuable assistance, especially D:r Mueller, which had the benevolence to examine the greater part of my new American species (more than 200), and Prof. Macoun, having sent about 7,000 specimens, collected in N. America in long travels during many years.

Linköping, Sweden 12 octob. 1896.

N. Conr. Kindberg.

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Ser. 1. Pleurocarpous.

Capsule lateral upon the stem or the branches, regularly dehiscent by a deciduous lid.

Stem usually very much ramose and depressed to the substrate, sometimes ascending, less often erect, rarely quite straight.

In *Hedwigia* the capsule is generally terminal.

Tribe 1. Tricholepidæ.

Segments of the endostome (inner peristome) ciliiform without keel or longitudinal line, free (neither connate nor united).

Capsule symmetric and erect; pedicel smooth. Leaves not distichous. Stem (except *Lindbergia*) without paraphyllia.

Sometimes the endostome or the whole peristome is wanting.

A. Leaves limbate by short cells; special alar cells generally not defined; inner cells seriate. Capsule often immersed.

Fam. 1. Cryphæaceæ.

Leaves smooth or papillose; borders recurved. Peristome sometimes simple or wanting. Calyptra cucullate or mitriform. Branches julaceous or subjulaceous.

B. Leaves not limbate; alar cells subquadrate; inner cells not seriate. Capsule not immersed.

Fam. 2. **Anomodontaceæ.**

Leaves generally papillose; borders sometimes recurved; upper and middle cells oval-rhombic or rotundate; costa simple. Peristome double or (in *Lindbergia*) simple. Calyptra cucullate.

Fam. 3. **Fabroniaceæ.**

Leaves smooth; borders not (or faintly near the base) recurved; upper cells suboblong or narrower. Peristome mostly simple. Calyptra cucullate. Plants mostly small, not tree-like.

Fam. 4. **Endotrichaceæ.**

Leaves smooth; borders not or indistinctly recurved; upper cells lanceolate-linear. Peristome double. Calyptra mitriform. Plants robust; stem tree-like.

Tribe 2. **Dicholepideæ.**

Endostomial segments carinate or marked with a longitudinal line, not united.

A. *Stenolepideæ*. Endostomial segments narrow (distinctly narrower than the exostomial teeth).

Capsule symmetric, not curved. Calyptra sometimes mitriform. Leaves not falcate.

a. *Distichophyllæ*. Leaves distichous.

Capsule sometimes immersed. Leaves smooth (not papillose).

Fam. 5. **Neckeraceæ.**

Upper leaf-cells generally short and wide. Pedicel of the capsule smooth. Calyptra cucullate or (in one species) mitriform. Stem sometimes with paraphyllia.

b. *Polystichophyllæ*. Leaves plurifarious.

Capsule exserted; pedicel smooth or (in *Daltonia* and *Helicodontium*) rough. Leaves often papillose.

Fam. 6. **Leptodontaceæ.**

Stem tree-like; branches often circinnate; paraphyllia often present. Leaves smooth; cells more or less dilated. Calyptra cucullate.

Fam. 7. **Meteoriaceæ.**

Stem pendent, without paraphyllia. Leaves papillose; cells very small, dilated or narrow. Calyptra mitriform or cucullate. Dioecious, very rarely fruiting.

Fam. 8. **Hookeriaceæ.**

Stem neither tree-like nor pendent; paraphyllia none. Leaves smooth or (in *Callicostella*) papillose; cells mostly dilated. Calyptra mitriform. Monoecious or polygamous.

Fam. 9. **Leskeaceæ.**

Stem decumbent, often with paraphyllia. Leaves mostly papillose; cells usually dilated. Calyptra cucullate.

Fam. 10. **Entodontaceæ.**

Stem generally decumbent, rarely ascending but not tree-like; paraphyllia none. Leaves smooth; cells mostly narrow. Calyptra cucullate.

B. *Platylepideæ*. Endostomial segments broad.

Capsule often asymmetric or curved. Calyptra cucullate. Leaves sometimes falcate.

a. Primary stem rhizomatic, mostly subterranean; secondary stems generally tree-like and suberect or ascending.

Leaves neither papillose nor falcate.

Fam. 11. **Olimnaceæ.**

Capsule symmetric or asymmetric; pedicel mostly smooth. Stem often with paraphyllia. Leaf-cells mostly narrow. Branch-leaves often strongly serrate.

b. Stem not tree-like, generally decumbent.

Fam. 12. **Thuidiaceæ.**

Capsule generally asymmetric or curved; pedicel generally smooth. Stem often with paraphyllia. Leaves usually papillose, not distichous, rarely falcate; cells mostly dilated.

Fam. 13. **Hypnaceæ.**

Capsule sometimes symmetric, more often asymmetric or curved; pedicel often rough. Stem mostly without paraphyllia. Leaves not papillose, sometimes distichous, often falcate; cells mostly narrow.

Tribe 3. **Symphylepideæ.**

Endostome cancellate by in upper part united segments.

Fam. 14. **Fontinalaceæ.**

Capsule symmetric, often immersed. Calyptra conic or cucullate. Leaves smooth, often tristichous, sometimes falcate; cells narrow. Plants growing in water.

Ser. 2. **Acrocarpous.**

Capsule (generally) terminal upon the stem or the branches. Stem usually straight and erect, mostly simple or sparingly branching.

The capsule is lateral in *Anoetangium*, *Mielichhoferia*, *Schlotkeimia*, *Macromitrium*, *Rhizogonium* and *Barbula squarrosa*. The stem is decumbent and much ramose (as in the pleurocarpous) in several *Grimmiaceæ*, *Orthotrichaceæ* and *Fissidentaceæ*, also in *Cinclidotus*: in *Leucolepis* tree-like.

Tribe 1. **Stegocarpous.**

Capsule with a distinct, generally deciduous lid.

Subtribe 1. **Fillicoideæ astomæ.**

Stem frondiform, more or less divided in nerveless lobes. Peristome none.

Fam. 15. *Schistostegaceæ*.

Capsule very small. Calyptra conic. Prothallium persistent.

Subtribe 2. *Ptychophyllæ astomæ*.

Stem with subcomplicate leaves. Peristome none.

Fam. 16. *Eustichiaceæ*.

Leaves distichous, narrowly alate at the costa; inner cells irregularly polygonal, the marginal ones narrow.

Subtribe 3. *Haplostomæ*.

Stem with not complicate leaves. Peristome simple, sometimes wanting.

Section 1. *Anarthrodontæ*. Peristomial teeth solid, not articulate.

Fam. 17. *Polytrichaceæ*.

Peristomial teeth 32 or 64, small and linguiform. Leaves with narrow lamellæ near the costa; upper cells roundish.

Fam. 18. *Georgiaceæ*.

Peristomial teeth 4, large and nearly subulate. Leaves not lamellate.

Section 2. *Arthrodontæ*. Peristomial teeth transversely articulate.

A. Leaves distichous, with two broad and embracing stipular appendages (wings) at the base.

Fam. 19. *Fissidentaceæ*.

Peristomial teeth 16, usually cleft. Leaf-cells round-hexagonal or the marginal ones narrow. Plants growing on earth, seldom in springs and rivers.

B. Leaves plurifarious or (in *Distichium*) distichous, without stipular appendages.

Leaves sometimes papillose or mamilllose, not rarely smooth. Plants seldom growing on trees.

a. Leaves generally not papillose (exc. some species of *Grimmia* and *Racomitrium*). Peristomial teeth not contorted.

a a. Peristomial teeth with a longitudinal line.

Fam. 20. *Splachnaceæ*.

Calyptra conic or subcucullate, very small. Peristomial teeth generally entire, seldom finally split. Leaves smooth, flaccid and faintly hygroscopic.

Capsule straight with a swollen neck or an umbra-culiform appendage (apophysis). Leaves broad; cells usually pellucid and large, the alar ones not defined. Plants often robust, usually growing on animal dung or rotten animals, rarely on rocks or trees.

Fam. 21. *Dicranaceæ*.

Calyptra cucullate, large or long. Peristomial teeth generally cleft. Leaves not flaccid, sometimes mamilliose.

Capsule often curved, generally narrow. Leaves mostly narrow and subulate-acuminate, often setiform; cells more or less pellucid, the alar ones often dilated and subquadrate. Tufts usually compact and very radiculose. Plants often robust, growing in swamps and woods, less often on rocks or trees.

b b. Peristomial teeth without longitudinal line.

Fam. 22. *Seligeriaceæ*.

Calyptra cucullate. Peristomial teeth not cleft. Leaves smooth, not opaque.

Capsule straight, short and thick. Leaves generally setiform and subulate-acuminate without hairpoint; cells more or less pellucid, the alar ones sometimes (in *Blindia*) dilated and subquadrate, often not defined. Plants mostly small and not densely (exc. *Blindia*) tufted, growing on rocks.

Fam. 23. *Grimmiaceæ*.

Calyptra mostly mitriform, sometimes cucullate. Peri-

stomial teeth often entire (or rimose), sometimes cleft. Leaves opaque, sometimes papillose.

Capsule straight, sometimes narrow, without distinct neck. Leaves mostly narrow and not subulate-acuminate, often with hairpoint; cells small, often with sinuous walls, the upper opaque but generally not well-defined from the lower ones; alar (subquadrate) cells not rarely distinct.

Tufts often dense and pulvinate. Plants not seldom small, generally growing on rocks.

b. Leaves generally papillose and opaque above. Peristomial teeth often contorted.

Fam. 24. *Weisiaceæ*.

Calyptra cucullate, deciduous. Peristomial teeth mostly without a longitudinal line, sometimes wanting

Capsule generally straight, often narrow, without (exc. *Dermatodon*) prominent neck; teeth either partite to the basal tube or deeply cleft, less often entire. Leaves mostly broad, often crisped when dry; upper cells very small, well-defined from the lower ones; alar cells not distinct or forming a margin near the base; cellwalls (exc. *Geheebia*) not sinuous. Tufts often loose. Plants mostly growing on earth and stones, often sterile.

Fam. 25. *Calymperaceæ*

Calyptra persistent, dehiscing with longitudinal slits above, constricted below the unripe capsule. Peristome none.

Capsule straight and oval without neck. Leaves narrow and convolute, crisped or cirrate in dry state; upper cells very small. Tufts often loose. Plants growing on trees, rarely fruiting.

Subtribe 4. *Diplostomæ*.

Peristome generally double.

Section 1. *Stenolepidæ*. Endostomial segments narrow, rarely confluent above. Peristomial teeth articulate. Leaves not complicate.

A. Leaves generally papillose and opaque above; upper cells mostly small and well-defined from the lower ones. Tufts dense. Calyptra rarely cucullate.

Fam. 26. *Encalyptaceæ*.

Calyptra long-acuminate, cylindric. Basal leaf-cells finally rufous.

Capsule cylindric, often not necked. Calyptra not hairy but often rough. Leaves entire, sometimes with hairpoint. Plants growing on earth and stones. Habit of *Barbula* (*Syntrichia*).

Fam. 27. *Orthotrichaceæ*.

Calyptra short-apiculate, usually mitriform (conic or campanulate), rarely cucullate. Basal leaf-cells not rufous.

Capsule oval-oblong or subcylindric, mostly with distinct neck. Calyptra generally hairy. Leaves usually entire, very seldom with hairpoint. Plants often pulvinate, usually growing on trees, sometimes on rocks. Habit of *Grimmia*.

B. Leaves generally smooth and not opaque; cells nearly uniform. Tufts sometimes loose. Calyptra cucullate. Plants growing in swamps or on rocks.

Fam. 28. *Meeseaceæ*.

Capsule oblique, generally with long neck; endostomial segments free.

Leaves mostly serrate, not or indistinctly limbate, resembling those of *Bryum* in the areolation.

Fam. 29. *Cinclidiaceæ*.

Capsule not oblique; neck short and thick or indistinct; endostomial segments connate above to a convex cupula.

Leaves entire, (usually broadly) limbate, resembling those of *Mnium punctatum*.

Section 2. *Platylepideæ*. Endostomial segments broad, not confluent; teeth articulate. Leaves not complicate.

A. Leaves generally papillose or mamilllose; cells sometimes diversiform. Capsule with indistinct or short neck.

Fam. 30. **Bartramiaceæ.**

Calyptra cucullate, entire, not inflate. Capsule subglobose or finally oblique; teeth often without longitudinal line; endostome sometimes with cilia. Tufts dense. Leaves mostly narrow. Plants perennial, growing on rocks or in swamps.

B. Leaves generally smooth (in *Aulacomnium* and *Timmia* sometimes papillose); cells polygonal, nearly uniform or gradually passing to the longer basal ones. Capsule often necked.

Fam. 31. **Funariaceæ.**

Calyptra inflate. Peristomial teeth without longitudinal line; endostome without cilia.

Calyptra often split or lobulate at base, mitriform or cucullate. Leaves very thin. Plants generally annual, small and not tufted, growing on earth.

Fam. 32. **Bryaceæ.**

Calyptra not inflate. Peristomial teeth with longitudinal line; endostome often with cilia.

Calyptra entire, cucullate. Plants generally perennial, mostly tufted, growing on earth and stone, sometimes in swamps, less often on trees.

Section 3. *Pseud-Arthrodon*. Endostomial segments wholly confluent to a plicate membrane; teeth incompletely articulate or wanting. Leaves not complicate, sometimes very small and nearly indistinct.

Fam. 33. **Buxbaumiaceæ.**

Plants small. Stem often indistinct.

Tribe 2. **Schizocarpous.**

Capsule dehiscent by 4 longitudinal slits, cohering above. Peristome none.

Fam. 34. *Andreaeaceae*.

Leaves often papillose; cells small, the upper short. Capsule blackish. Habit of *Grimmia* (Schistidium).

Tribe 3. *Cleistocarpous*.

Capsule not dehiscent; lid not distinct. Plants mostly small.

Fam. 35. *Bruchiaceae*.

Leaves narrow; cells elongate. Capsule often (principally in American species) necked. Prothallium often persistent. Habit of *Trematodon* and *Dicranella*.

Fam. 36. *Voitiaceae*.

Leaves broad, entire and flaccid, smooth; cells large and wide. Capsule without distinct neck. Habit of *Splachnum*.

Fam. 37. *Physcomitrellaceae*.

Leaves broad, serrate and flaccid, smooth; cells polygonal, nearly uniform, the upper short. Capsule necked. Calyptra inflate. Habit of *Physcomitrium*.

Fam. 38. *Phascaceae*.

Leaves generally broad, often entire, not seldom papillose; upper cells short. Capsule without neck. Habit of *Pottia*.

Fam. 1. *Cryphaeaceae*

A. Leaves nerveless, generally entire (or indistinctly sinuate above).

1. *Hedwigia*. Capsule generally terminal, often immersed; peristome none; calyptra submitriform or cucullate, sometimes hairy. Leaves papillose; upper cells suboval-oblong. Monoecious or synoecious.

2. *Leucodon*. Capsule lateral, mostly exserted; teeth whitish; endostome wanting or rudimentary; calyptra cucullate, glabrous. Leaves smooth; upper cells oblong or lanceolate. Dioecious.

B. Leaves costate, sometimes denticulate.

a. Costa of the leaves simple. Monoecious.

3. *Forsstroemia*. Capsule often exserted; peristome simple without endostome; calyptra cucullate, hairy. Leaves indistinctly papillose; upper cells suboval.

4. *Cryphaea*. Capsule immersed; peristome double; calyptra papillose above, mitriform or cucullate. Leaves papillose; upper cells short or elongate.

b. Costa of the leaves divided into 3 or 5 branches. Dioecious.

5. *Antitrichia*. Capsule exserted; peristome double; calyptra cucullate, glabrous. Leaves smooth; upper cells mostly narrow.

Fam. 2. *Anomodontaceæ* (new fam.)

6. *Anomodon*. Endostomial segments mostly short. Leaves generally entire. Stem without paraphyllia. Dioecious.

7. *Lindbergia* (new genus). Endostome wanting. Leaves denticulate at acumen. Stem with paraphyllia. Monoecious.

Fam. 3. *Fabroniaceæ*.

A. Peristome simple, rarely (in one species of *Fabronia*) wanting. Plants small.

a. Leaves serrate or fimbriate. Capsule not annulate; calyptra unripe mitriform, finally split at one side and cucullate.

8. *Fabronia*. Lid of the capsule not rostrate; teeth with longitudinal line, often united in pairs. Costa of the leaves simple or indistinct. Monoecious.

b. Leaves entire or (above) minutely denticulate. Capsule annulate; calyptra cucullate.

9. *Clasmatodon*. Lid of the capsule rostellate; teeth irregular and narrow, generally without longitudinal line, sometimes split below. Leaves sometimes denticulate above; costa simple. Monoecious.

10. *Habrodon*. Lid of the capsule conic, not rostellate; teeth with longitudinal line. Leaves entire, nerveless. Dioecious.

B. Peristome double. Leaves somewhat large.

11. *Anacamptodon*. Lid of the capsule rostellate; teeth united in pairs (as in *Orthotrichum*), with longitudinal line; annulus none; pedicel long. Leaves entire; costa simple. Monoecious.

Fam. 4. *Endotrichaceæ* (new fam.)

12. *Pterobryum*. Leaves nearly entire; inner cells sublinear; costa long and simple.

Fam. 5. *Neckeraceæ*.

13. *Neckera*. Capsule sometimes immersed; cilia wanting. Leaves not truncate above, often undulate; costa mostly short and double. Stem usually pinnate, often with flagellate branches, sometimes with paraphyllia. Mostly dioecious.

14. *Neckeropsis*. Capsule immersed. Leaves truncate, sometimes undulate; costa simple. Stem irregularly branching without flagellæ and paraphyllia. Synoecious. Calyptra sometimes mitriform.

15. *Porotrichum*. Capsule exserted; cilia appendiculate. Leaves neither truncate nor undulate; costa simple. Stem subpinnate with paraphyllia. Dioecious.

Fam. 6. *Leptodontaceæ* (new fam.)

16. *Leptodon*. Capsule scarcely exserted. Leaves not limbate. Branches (secondary stems) involute-circinnate when dry; paraphyllia present.

17. *Macouniella* (new genus). Capsule distinctly exserted. Leaves limbate to the acumen by round-quadrate cells. Branches not circinnate; paraphyllia wanting.

Fam. 7. *Meteoriaceæ*.

18. *Papillaria*. Alar leaf-cells numerous; inner cells dilated; costa short and double.

19. *Meteorium*. Alar leaf-cells few; inner cells sublinear; costa simple.

Fam. 8. *Hookeriaceæ*.

I. *Hookeriæ*. Capsule and pedicel smooth. Upper leaf-cells very dilated.

A. Leaves with 2 long nerves, generally narrowly limbate; upper cells round-hexagonal.

20. *Hookeria*. Leaves smooth; cells large; nerves not spiniform. Calyptra lobulate at base. Monoecious or polygamous.

21. *Callicostella*. Leaves papillose; cells not large; nerves spiniform. Calyptra fringed. Monoecious.

B. Leaves not or obsoletely costate, not distinctly limbate; upper cells oval-hexagonal.

22. *Pterygophyllum*. Leaves smooth; cells large. Calyptra lobulate at base. Monoecious.

II. *Daltoniæ*. Capsule and pedicel rough. Upper leaf-cells suboblong.

23. *Daltonia*. Leaves smooth, broadly limbate; costa long and simple. Calyptra fringed below the narrow point. Monoecious or synoecious.

Fam. 9. *Leskeaceæ*.

A. Leaves with papilliferous cilia.

24. *Thelia*. Leaves strongly papillose, from the broadly round-ovate base abruptly tapering to the long acumen, not recurved; upper and middle cells rotundate; costa short. Stem often with numerous paraphyllia; branches erect and julaceous.

B. Leaves not ciliate.

a. Stem with paraphyllia. Leaves often papillose.

25. *Pterygynandrum*. Leaves papillose; upper cells suboblong, the inner ones narrower; costa short, simple

or double. Paraphyllia few. Endostomial segments often rudimentary. Dioecious.

26. *Leskea*. Leaves papillose; cells rotundate-quadrate; costa long. Paraphyllia numerous. Endostomial segments rimose. Monoecious.

27. *Lescuræa*. Leaves smooth or (seldom) faintly papillose; cells lanceolate-linear; costa long. Paraphyllia not numerous. Endostomial segments entire, very narrow. Dioecious.

b. Stem without paraphyllia. Leaves smooth; middle and upper cells dilated, suboblong or oval; costa mostly simple.

28. *Myrinia*. Pedicel of the capsule smooth. Leaves entire.

29. *Helicodontium*. Pedicel of the capsule rough. Leaves serrulate.

Fam. 10. *Entodontaceæ* (new fam.)

I. *Apterygiæ*. All leaf-cells narrow, linear; costa indistinct.

30. *Holmgrenia*. Leaves entire, usually shining; lower basal cells mostly orange-colored. Capsule annulate. Stem irregularly divided or simple. Dioecious, rarely fruiting.

II. *Entodontæ*. Alar leaf-cells subquadrate; middle cells generally narrow; costa short and double or indistinct.

A. Leaves not recurved, mostly obtusate; alar cells usually large

31. *Entodon*. Capsule generally erect; lid often rostrate; annulus mostly broad; endostomial segments lower than the teeth. Mostly monoecious.

B. Leaves recurved, acuminate and acute; alar cells small.

32. *Platygyrium*. Capsule erect; lid seldom rostrate; annulus broad; endostomial segments not lower than the teeth. Alar leaf-cells not numerous. Mostly dioecious.

33. *Tripteris adium*. Capsule often cernuous; lid not rostrate; (annulus not seen); endostome lower than the teeth. Alar leaf-cells numerous. Mostly monoecious.

Fam. 11. *Olimnaceae* (new fam.)

A. Capsule symmetric; pedicel smooth. Branch-leaves generally serrate.

I. *Climaciæ*. Branches with numerous paraphyllia. Columella of the capsule exserted. Endostome without cilia.

34. *Climacium*. Inner leaf-cells narrow; alar cells short, numerous, often finally reddish; costa simple. The naked part of the stem usually long; branches simple, fasciculate.

II. *Isotheciæ*. Branches without paraphyllia. Columella of the capsule not exserted. Endostome often with cilia.

35. *Alsia*. Leaves not mamillöse; inner cells narrow, the alar ones numerous; costa simple. Cilia of the endostome appendiculate; segments long.

36. *Isothecium*. Leaves (principally the uppermost) mamillöse above; inner cells mostly narrow, the upper ones sometimes dilated; alar cells not numerous; costa simple. Cilia of the endostome seldom appendiculate; segments long.

37. *Pterogonium*. Leaves mamillöse; inner cells suboval, the alar ones very numerous; costa short and double. Segments of the endostome short; cilia wanting.

B. Capsule generally asymmetric; pedicel sometimes rough. Branch-leaves sometimes entire or denticulate.

III. *Hylocomiæ*. Upper and middle leaf-cells narrow.

38. *Hylocomium*. Endostome with cilia. Pedicel of the capsule often rough. Alar leaf-cells generally not large, sometimes indistinct; costa mostly double. Stem pinnate or bi-tripinnate; the naked part not long; paraphyllia sometimes wanting.

39. *Girgensohnia*. Endostome without cilia. Pedicel of the capsule smooth. Alar leaf-cells very large; costa

33. *Tripterocladium*. Capsule often cernuous; lid not rostrate; (annulus not seen); endostome lower than the teeth. Alar leaf-cells numerous. Mostly monoecious.

Fam. 11. *Climaciaceæ* (new fam.)

A. Capsule symmetric; pedicel smooth. Branch-leaves generally serrate.

I. *Climaciæ*. Branches with numerous paraphyllia. Columella of the capsule exserted. Endostome without cilia.

34. *Climacium*. Inner leaf-cells narrow; alar cells short, numerous, often finally reddish; costa simple. The naked part of the stem usually long; branches simple, fasciculate.

II. *Isotheciæ*. Branches without paraphyllia. Columella of the capsule not exserted. Endostome often with cilia.

35. *Alsia*. Leaves not mamillöse; inner cells narrow, the alar ones numerous; costa simple. Cilia of the endostome appendiculate; segments long.

36. *Isothecium*. Leaves (principally the uppermost) mamillöse above; inner cells mostly narrow, the upper ones sometimes dilated; alar cells not numerous; costa simple. Cilia of the endostome seldom appendiculate; segments long.

37. *Pterogonium*. Leaves mamillöse; inner cells suboval, the alar ones very numerous; costa short and double. Segments of the endostome short; cilia wanting.

B. Capsule generally asymmetric; pedicel sometimes rough. Branch-leaves sometimes entire or denticulate.

III. *Hylocomiæ*. Upper and middle leaf-cells narrow.

38. *Hylocomium*. Endostome with cilia. Pedicel of the capsule often rough. Alar leaf-cells generally not large, sometimes indistinct; costa mostly double. Stem pinnate or bi-tripinnate; the naked part not long; paraphyllia sometimes wanting.

39. *Girgensohnia*. Endostome without cilia. Pedicel of the capsule smooth. Alar leaf-cells very large; costa

simple. Stem bi-tripinnate; the naked part long; paraphyllia numerous.

IV. *Thamnieæ*. Upper leaf-cells generally round-rhombic, the middle suboval.

40. *Thamnium*. Endostome with appendiculate cilia. Pedicel of the capsule smooth. Alar leaf-cells few, small and not much distinct; costa simple. Stem with fasciculate branches or pinnate; the naked part mostly long; paraphyllia none.

Fam. 12. *Thuidiaceæ* (new fam.)

A. Costa of the leaves short, mostly double, or indistinct.

a. Leaves erect or appressed when moist, not recurved; costa double or indistinct. Capsule suberect. Branches erect; paraphyllia wanting.

41. *Myurella*. Leaves cochleariform; cells rotundate. Branches julaceous.

b. Leaves patent or spreading when moist, sometimes recurved; costa sometimes simple. Capsule usually inclined. Branches decumbent; paraphyllia few or wanting.

42. *Heterocladium*. Leaves spreading and claviculiform or subfalcate when moist, generally dimorphous; those of the stem seldom appressed when dry; middle cells oval-oblong.

43. *Pseudoleskeella* (new genus.) Leaves not spreading when moist, appressed when dry, not seldom homomorphous; cells generally round-oval.

B. Costa of the leaves long and simple, mostly subpercurrent.

44. *Pseudoleskea*. Leaves homomorphous. Stem not regularly pinnate.

Leaves sometimes not papillose, not seldom falcate, mostly patent when dry; cells oval-oblong or narrower. Stem usually with paraphyllia.

45. *Thuidium*. Leaves dimorphous. Stem pinnate. Leaves usually papillose, not falcate, appressed or

crisped when dry; cells mostly round-oval, less often sub-oblong, seldom narrower. Paraphyllia sometimes wanting.

Fam. 13. *Hypnaceæ*.

A. Capsule generally symmetric and erect, not curved.

I. *Pylaisiæ*. Leaves neither distichous nor falcate; angular or alar cells subquadrate; costa short and double or indistinct. Endostomial segments sometimes partly connate with the teeth; annulus mostly indistinct. Pedicel of the capsule smooth. Monoecious.

46. *Pylaisia*. Endostomial segments reaching above the teeth. Lid of the capsule not rostrate. Alar (angular) leaf-cells small, usually green.

47. *Pylaisiella* (new genus). Endostomial segments lower than the teeth. Lid of the capsule rostrate. Special alar cells sometimes large and pellucid.

B. Capsule generally asymmetric and inclined or curved.

II. *Raphidostegieæ*. Leaves not rarely subdistichous, often incurved or subfalcate, acute, generally acuminate, mostly recurved at the borders; alar cells vesiculiform and rotundate, orange or hyaline; inner cells generally narrow. Capsule usually small; lid rostrate; pedicel smooth.

48. *Raphidostegium*. Leaves usually small; costa mostly indistinct. Stem without paraphyllia.

III. *Plagiotheciæ*. Leaves generally distichous or subdistichous by the complanate branches, not curved, seldom recurved at the borders; alar cells polygonal or indistinct; inner cells generally narrow. Lid of the capsule sometimes rostrate; pedicel usually smooth. Stem sometimes (in some species of *Rhynchostegium*) with paraphyllia.

a. Leaves mamillöse above.

49. *Rhynchostegium*. Leaves acuminate and acute; cells not seriate; costa often simple. Lid of the capsule usually rostrate. Stem often with paraphyllia.

50. *Taxithelium*. Leaves obtusate or short-acuminate; cells seriate; costa indistinct. Lid of the capsule not rostrate. Stem without paraphyllia.

b. Leaves not mamilllose. Stem without paraphyllia.

51. *Plagiothecium*. Lid of the capsule usually not rostrate. Alar leaf-cells not numerous, often indistinct; apical cells narrow; costa mostly indistinct or short and double.

52. *Stereophyllum*. Lid of the capsule rostellate. Alar leaf-cells small but very numerous; upper cells sub-oval; costa long and simple.

IV. *Amblystegia*e. Leaves neither distichous nor falcate, rarely recurved at the borders; alar cells polygonal or indistinct; middle cells generally oval-oblong. Lid of the capsule not rostrate; pedicel smooth. Stem without paraphyllia. — Tufts usually not shining. Leaves mostly small.

53. *Amblystegium*. Leaves not limbate, all acuminate and acute; costa often short and double (or indistinct).

54. *Platyloma* (new genus). Leaves broadly limbate by linear cells, those of the branches obtusate; costa long and simple.

V. *Hypn*eae. Leaves generally not distichous, often falcate; alar cells polygonal or indistinct; upper and middle cells generally narrow. Lid of the capsule often rostrate; pedicel often rough. Stem less often with paraphyllia.

Here belonging genera are rather subgenera of *Hypnum* and not wholly distinct.

a. Leaves generally obtusate (at least those of the stem), not triangular; costa often short and double. Lid of the capsule not rostrate; pedicel smooth. Stem without paraphyllia.

55. *Calliergon* (new genus). Leaves of the branches sometimes falcate.

b. Leaves acuminate and acute, generally triangular, not falcate; costa long and simple. Lid of the capsule

often apiculate; pedicel usually rough. Stem rarely (in one species) with paraphyllia.

56. *Camptothecium*. Leaves plicate below, recurved at the borders; alar cells small, generally impressed at the basal angles. Capsule sometimes straight. Tufts often shining. Mostly dioecious.

c. Leaves acuminate and acute, arrounded or decurrent at base, not triangular, rarely falcate; costa generally long and simple. Lid of the capsule often rostrate; pedicel often rough. Stem rarely (in few species) with paraphyllia.

57. *Eurhynchium*. Leaves mamilllose above (at least the younger ones), rarely plicate, not or faintly (near the base) recurved; costa simple. Lid of the capsule often rostrate; pedicel often rough. Stem often pinnate.

58. *Brachythecium*. Leaves not mamilllose above, often plicate in the middle and recurved at the borders; costa simple. Lid of the capsule rarely (in few species) rostrate; pedicel often rough. Stem generally not regularly pinnate.

59. *Campyllum*. Leaves not mamilllose above, not plicate, generally not recurved, often spreading; costa mostly short and double (or indistinct). Lid of the capsule not rostrate; pedicel smooth. Stem sometimes pinnate; paraphyllia wanting.

d. Leaves acuminate and acute, neither triangular nor falcate; costa short and double or indistinct. Lid of the capsule often rostrate; pedicel smooth. Stem usually with numerous paraphyllia.

60. *Heterophyllum* (new genus). Leaves mamilllose above.

e. Leaves acuminate or apiculate, acute, not falcate, with a cordate, broadly auricled base; costa simple, double or indistinct. Lid of the capsule rostrate; pedicel smooth. Stem without paraphyllia.

61. *Myurium*. Branches julaceous. Plants robust. Areolation of the leaves variable.

f. Leaves acute and subulate-acuminate, generally

faucate. Lid of the capsule rarely rostrate; pedicel smooth or (in one species) faintly rough above. Stem sometimes with paraphyllia.

62. *Hypnum*. Leaves often mamilllose above, less often recurved at the borders. Stem often pinnate.

Fam. 14. **Fontinalaceæ.**

I. *Fontinaleæ*. Leaves nerveless, not falcate. Capsule immersed; lid not often rostrate; calyptra conic.

63. *Fontinalis*. Peristome long. Leaves not limbate, often tristichous; alar cells more or less distinct. Dioecious or (rarely) paroecious.

II. *Dichelymeæ*. Leaves costate and falcate. Capsule mostly exserted; lid rostrate; calyptra cucullate.

64. *Dichelyma*. Capsule mostly exserted; teeth long; calyptra large. Leaves usually not limbate; alar cells near indistinct; costa often excurrent. Dioecious.

65. *Brachelyma*. Capsule immersed; teeth short; calyptra very small and short. Leaves limbate; costa not excurrent.

Fam. 15. **Schistostegaceæ.**

66. *Schistostega*. Capsule pedicellate, subglobose.

Fam. 16. **Eustichiaceæ.**

67. *Eustichia*. Capsule pedicellate, globose.

Fam. 17. **Polytrichaceæ.**

A. Leaves limbate by narrow cells, not sheathing.

68. *Catharinea*. Leaves not lamelliferous at back, not contracted above the base, usually long, always flaccid, crisped when dry; lamellæ few, not sinuolate. Capsule symmetric without angles and appendage (apophysis), not papillose; calyptra glabrous or at apex rough, long-acuminate. Sometimes paroecious, mostly dioecious.

B. Leaves not limbate, usually sheathing. Dioecious.

a. Leaves with sinuolate or serrate lamellæ.

69. *Oligotrichum*. Leaves lamelliferous on both sides, not contracted above the base, more or less crisped; lamellæ not numerous, those of the upper side sinuolate, those of the under side usually serrate. Capsule subsymmetric without angles and apophysis; calyptra sparingly hairy or glabrous.

70. *Psilopilum*. Leaves not lamelliferous at back, contracted above the base, rigid; lamellæ numerous, sinuolate. Capsule asymmetric without angles and apophysis; calyptra glabrous.

71. *Bartramiopsis* (new genus). Leaves not lamelliferous at back, long-ciliate near the sheathing base, flaccid, more or less crisped when dry; lamellæ few, serrate. Capsule without angles and apophysis; teeth, lid and calyptra unknown.

b. Leaves lamellate only at the upper side; lamellæ neither sinuolate nor serrate.

72. *Catharinella* (new genus). Leaves not contracted above the (more or less or not sheathing) base, flaccid, crisped when dry; lamellæ numerous, not densely cohering. Capsule papillose without angles and apophysis; calyptra densely hairy, short-acuminate.

73. *Polytrichum*. Leaves abruptly contracted above the distinct sheath, often rigid, sometimes incurved, not crisped; lamellæ densely cohering, seldom (in one species) few (about 10), otherwise numerous. Capsule smooth or papillose, often with angles and apophysis; calyptra densely hairy with a not long acumen, rarely (in one species) sparingly hairy and long-acuminate.

Fam. 18. *Georgiaceæ*.

74. *Georgia*. Capsule exserted. Leaves smooth; cells small, the upper short, hexagonal or oval. Plants small, sometimes minute.

Fam. 19. *Fissidentaceæ*.

75. *Fissidens*. Peristomial teeth united in pairs,

cleft. Pedicel of the capsule exserted. Leaves usually approached.

76. *Conomitrium*. Peristomial teeth not united in pairs, entire or cleft. Pedicel of the capsule immersed. Leaves very loosely disposed.

Fam. 20. *Splachnaceæ*.

I. *Splachneæ*. Peristome present. Leaves not opake.

A. Capsule with a (mostly thicker) swollen neck or an umbraculiform appendage (apophysis) of different color; pedicel flaccid; teeth not split, usually deflexed and appressed when dry. Spores small. Calyptra mostly conic. Leaves not recurved, often subulate-acuminate; costa not excurrent.

77. *Splachnum*. Peristomial teeth united below, formed by 3 layers; columella exserted. Tufts loose. Usually dioecious.

78. *Haplodon* (new genus). Peristomial teeth distant, formed by 2 layers; columella not exserted. Tufts dense. Monoecious.

B. Capsule with a swollen neck of same color; pedicel rigid. Calyptra subcucullate. Tufts usually dense.

a. Leaves subulate-acuminate, not recurved; costa often excurrent. Capsule narrower than the neck; teeth usually deflexed and appressed when dry; columella not exserted.

79. *Tetraplodon*. Peristomial teeth united below, formed by 2 layers. Usually monoecious. Spores small.

b. Leaves not subulate-acuminate, more or less distinctly recurved below; costa rarely (in one species) excurrent. Capsule thicker than the neck; teeth often erect; columella often exserted.

80. *Dissodon*. Capsule with a claviform neck; teeth entire, erect when dry. Leaves obtusate and obtuse, entire or indistinctly denticulate above. Spores large, about 0.03 or 0.04 mm. Sometimes synoecious.

81. *Tayloria*. Capsule with a subcylindric neck;

teeth sometimes (in *T. splachnoides*) partite, mostly deflexed when dry. Leaves acuminate, serrate above. Spores small. Monoecious.

II. *Oedipodieæ*. Peristome wanting. Leaves opaque. Pedicel of the capsule confluent with the neck.

82. *Oedipodium*. Pedicel and neck of the capsule tubular, whitish green, not rigid. Leaves obtuse and entire, with long cilia at base; costa broad. Sometimes synoecious.

Fam. 21. Dicranaceæ.

A. Peristomial teeth {

I. *Octoblephareæ*. Peristomial teeth entire, short and pale yellowish. Capsule straight; pedicel short. Leaves whitish and rigid, not mamilliose; marginal cells numerous at the base; costa very broad.

83. *Octoblepharum*. Plants small.

B. Peristomial teeth 16. Leaves whitish, nearly filled by the costa; marginal cells obsolete.

II. *Leucobryeæ*. Capsule curved; teeth bifid, long and red; pedicel long. Leaves not mamilliose, plurifarious.

84. *Leucobryum*. Plants generally robust.

C. Peristomial teeth 16. Leaves green, with distinct cells on both sides of the costa.

a. Leaves distichous.

III. *Distichieæ*. Capsule erect or inclined; teeth cleft. Leaves sheathing; lower cells narrow, the upper quadrate; alar cells not defined.

85. *Distichium*. Leaves long and narrow; costa long-excurrent.

b. Leaves plurifarious.

aa. Leaf-cells dilated, the upper obliquely polygonal.

IV. *Aongstroemieæ*. Capsule straight, very small; teeth cleft. Leaves not mamilliose, short and obtuse.

86. *Aongstroemia*. Capsule ovoid, not striate. Plants very small.

bb. Leaf-cells narrow, at least the lower ones; the upper rectangular, quadrate or suboblong-oval.

V. *Trematodontaceæ*. Capsule curved; teeth cleft or entire. Leaves not mamilllose; alar cells not defined. Differs from other *Dicranaceæ* in the long neck of the capsule.

87. *Trematodon*. Leaves mostly narrow.

VI. *Ditricheæ*. Capsule generally straight; teeth partite with subfiliform legs. Leaves not mamilllose, narrow; cells narrow, the alar seldom distinct.

88. *Ditrichum*. Capsule usually not sulcate when dry. Habit of *Dicranella*.

VII. *Cynodonticeæ*. Capsule oblique or straight; teeth cleft (in *Cynodontium schisti* mostly entire). Leaves mamilllose, mostly recurved, denticulate; upper cells subquadrate; alar cells generally not well-defined; costa narrow, not excurrent. Calyptra not fimbriate.

89. *Cynodontium*. Leaves not sheathing. Capsule mostly sulcate.

90. *Dichodontium*. Leaves sheathing. Capsule not sulcate.

VIII. *Dicraneæ*. Capsule curved or straight; teeth cleft or (in few species) partite with subulate legs. Leaves generally not mamilllose and not recurved, denticulate or entire; alar cells (exc. some species of *Campylopus*) well-defined. Leaves generally setiform and somewhat rigid, sometimes crisped when dry. Plants mostly robust.

91. *Dicranum*. Calyptra not fimbriate. Leaves without hairpoint; alar cells distinct; costa mostly narrow, not often long-excurrent. Pedicel of the capsule (exc. 2 species) straight.

92. *Campylopus*. Calyptra fimbriate at base. Leaves sometimes with hairpoint; alar cells sometimes not defined; costa mostly very broad and long-excurrent. Pedicel of the capsule arcuate or flexuous. Not often fruiting.

IX. *Dicranelleæ*. Capsule curved or straight; teeth cleft or entire. Leaves not mamilllose, sometimes recurved, denticulate or entire; alar cells not often distinct;

costa mostly narrow. Plants generally not large (exc. *Oncophorus* and *Oreas*).

* Peristomial teeth cleft.

93. *Dicranella*. Capsule mostly curved, sometimes strumose, often sulcate when dry. Leaves narrow, often entire, sometimes sheathing; cells generally narrow, the alar not (exc. *D. rubra*) defined; costa often excurrent, seldom broad.

94. *Dicranoweisia*. Capsule straight and not strumose (or, in one species, slightly curved and substrumose), not sulcate. Leaves narrow, entire, not sheathing; upper cells short; alar cells mostly distinct; costa narrow, rarely excurrent.

95. *Oncophorus*. Capsule curved, strumose, not sulcate. Leaves with a very broad and sheathing base, often entire; upper cells short; alar cells not defined; costa narrow, not excurrent. Plants mostly large.

** Peristomial teeth us. entire. Capsule straight, striate, not strumose. Leaves narrow, denticulate; upper cells short.

96. *Rhabdoweisia*. Capsule terminal; pedicel straight. Costa of the leaves not excurrent. Plants small.

97. *Oreas*. Capsule lateral or sublateral; pedicel arcuate. Costa of the leaves excurrent. Plants generally large.

Fam. 22. Seligeriaceæ.

I. *Seligeriaceæ*. Alar leaf-cells not distinct. Plants very small, generally not tufted. Monoecious.

98. *Seligeria*. Calyptra cucullate. Peristome usually well-evolute, in one species wanting.

99. *Brachydontium*. Calyptra submitriform and lobate. Peristome rudimentary. Habit of *Seligeria*.

100. *Trochobryum*. Peristome rudimentary; teeth very short and truncate. Calyptra cucullate. Leaves with a very long-excurrent costa.

II. *Blindieæ*. Alar leaf-cells dilated, generally qua-

drate. Plants larger than the *Seligeriaceæ*, tufted. Usually dioecious.

101. *Blindia*. Peristome well-wolute or wanting. Habit of *Dicranella*.

Fam. 23. *Grimmiaceæ*.

A. Capsule thin-walled, generally terminal; lid soon deciduous, not thick.

1. *Grimmiaceæ*. Lower leaf-cells rectangular or quadrate. Spores not large.

a. Calyptra not plicate, mitriform or (sometimes in *Grimmia*) cucullate. Leaves not (exc. *Grimmia caespiticia*) distinctly sulcate. Capsule exserted or (sometimes in *Grimmia*) immersed.

102. *Grimmia*. Peristome short; teeth often entire, rarely rudimentary or wanting. Leaves often with hairpoint; cells (seldom all) sometimes with sinuous walls, diversiform. Pedicel of the capsule generally not long, sometimes curved. Stem mostly erect.

103. *Racomitrium*. Peristome long; teeth usually partite. Leaves often with hairpoint; cells (mostly all, exc. the alar ones) with sinuous walls, generally diversiform. Pedicel of the capsule straight, generally long. Stem mostly decumbent or ascending.

104. *Campylostelium*. Peristome long; teeth more or less cleft, incurved when dry. Leaves without hairpoint; cells rectangular with not sinuous walls. Pedicel of the capsule often curved. Stem erect and simple. Habit of *Seligeria*. Plants very small.

b. Calyptra plicate, mitriform. Leaves often sulcate; cell-walls not sinuous. Stem erect.

105. *Coscinodon*. Capsule immersed. Leaves with a long hairpoint, not crisped when dry. Dioecious or monoecious. Habit of *Grimmia pulvinata*.

106. *Brachysetium*. Capsule exserted. Leaves without hairpoint, crisped when dry. Monoecious. Habit of *Orthotrichum* (Ulota.)

II. *Drummondieæ*. Leaf-cells rotundate. Spores very large.

107. *Drummondia*. Capsule exserted; teeth rudimentary; pedicel straight. Calyptra concave, involving the capsule, finally cucullate. Leaves without hairpoint; cellwalls not sinuous. Stem decumbent; branches short and erect. Habit of *Orthotrichum*.

B. Capsule thick-walled, sublateral on short branches; lid thick, long-persistent upon the thick and elevate columella.

III. *Scoulerieæ*. Capsule immersed, very broad and cupuliform; calyptra cucullate.

108. *Scouleria*. Capsule small-mouthed when young, blackish when dry; teeth very short and brittle, finally often adhering to the lid. Leaves dentate, without hairpoint; the lower ones, when emarcid, with persistent costa; cellwalls not sinuous. Spores very large, about 0.05—0.06 mm. Stem branching, floating in water. Plants robust. Dioecious. Habit of *Cinclidotus*.

Fam. 24. Weisiaceæ.

A. Peristome not cancellate.

I. *Barbuleæ*. Peristomial teeth partite to the basal (often tessellate, more or less distinct) tube, with hair-like, mostly long and often contorted branches. Capsule without distinct neck, generally straight.

* Leaves without lamellæ on the costa.

109. *Barbula*. Capsule symmetric, straight or (rarely) faintly curved; teeth not incurved. Leaves usually papillose; cell-walls not sinuous.

110. *Ceratodon*. Capsule (more or less) asymmetric, usually curved; teeth incurved when dry, not contorted. Leaves smooth; cell-walls not sinuous.

111. *Gekeebia*. Leaves papillose; cell-walls sinuous. Capsule unknown. Plants robust.

** Leaves with lamellæ or brood-filaments on the costa, papillose.

112. *Aloina*. Peristome contorted. Leaves strongly involute above; filaments very numerous; costa very broad. Stem very short. Pedicel of the capsule long.

113. *Crossidium*. Peristome usually contorted. Leaves reflexed or flat at the borders, imbricate; filaments numerous; costa narrow.

114. *Pterygoneuron*. Peristome not contorted, mostly wanting. Leaves imbricate, not involute; lamellæ few; costa narrow. Monoecious.

II. *Didymodontæ*. Peristomial teeth not partite but more or less cleft (or in *Pottia* entire), with longitudinal line, not contorted but sometimes half-twisted; basal tube very short. Leaves without lamellæ on the costa.

* Capsule symmetric without distinct neck.

115. *Didymodon*. Peristomial teeth more or less cleft. Leaves usually papillose, generally broader near the base. Habit of *Barbula* (Eu-*Barbula*).

116. *Pottia*. Peristomial teeth not cleft, often rudimentary or wanting. Leaves broader above the middle, often smooth. Habit of *Barbula* (*Tortula*).

** Capsule oblique or arcuate with a thick neck.

117. *Dermatodon*. Peristomial teeth cleft. Leaves papillose, broader above the middle. Habit of *Ceratodon*.

III. *Weisia*. Peristomial teeth without longitudinal line, not twisted, generally short and entire (rarely cleft), sometimes wanting; basal tube not distinct. Leaves without lamellæ.

118. *Weisia*. Capsule without neck, generally straight and symmetric. Leaves usually papillose, not limbate, not seldom involute above, often crisped when dry.

IV. *Syrrhopodontæ*. Peristomial teeth without longitudinal line and basal tube, not twisted, short and entire. Leaves bilamellate at the borders or limbate, often with propagula.

119. *Syrrhopodon*. Capsule straight and symmetric, subcylindric, narrowed above to the mouth, long-

rostrate, not or indistinctly necked; pedicel elongate. Leaves sheathing and channelled, denticulate, crisped when dry; basal cells, at least the inner ones, hyaline; costa not excurrent. Dioecious, rarely fruiting.

B. Peristome cancellate at base, divided above in filiform, more or less cohering branches.

V. Cinclidotæ. Leaves without lamellæ, often smooth; borders thick. Dioecious.

120. *Dialytrichia.* Capsule terminal on the stem; pedicel long; teeth faintly twisted. Leaves papillose, obtuse.

121. *Cinclidotus.* Capsule placed on small lateral branches, often nearly immersed; pedicel short; teeth not or scarcely twisted. Leaves generally smooth, often acute.

Fam. 25. Calymperaceæ.

122. *Calymperes.* Capsule oval; pedicel short. Leaves not sheathing, suboblong, entire and convolute, rigid when dry, often with propagula; basal cells, at least the inner ones, hyaline. Dioecious. Habit of *Syrrophodon*.

Fam. 26. Encalyptaceæ.

123. *Encalypta.* Leaves very papillose above. Peristome variable or wanting.

124. *Merceya.* Leaves smooth or indistinctly papillose. Capsules unknown.

Fam. 27. Orthotrichaceæ.

I. *Orthotricheæ.* Capsule terminal, often immersed; peristome generally double; segments usually ciliiform; calyptra mitriform. Leaves usually papillose, often crisped; inner cells not seriate; alar cells sometimes subquadrate; costa not excurrent. Stem generally erect and sparingly branching, seldom decumbent. Tufts often pulvinate.

125. *Orthotrichum.* Calyptra generally plicate and hairy.

II. *Macromitrieæ.* Capsule lateral, not immersed; calyptra subcampanulate. Leaves indistinctly papillose; cells obliquely seriate, the alar not defined. Stem creeping; branches numerous.

126. *Macromitrium*. Capsule plicate; teeth rudimentary or wanting; calyptra plicate. Leaves seldom crisped when dry; costa not excurrent.

127. *Schlotheimia*. Capsule not plicate; peristome double or wanting; calyptra generally not plicate. Leaves slightly crisped; costa excurrent to a thick point.

III. *Zygodontæ*. Capsule terminal or lateral; calyptra cucullate, not plicate, glabrous. Leaves papillose, often crisped; costa sometimes excurrent. Stem erect.

128. *Zygodon*. Capsule terminal, striate; peristome double or wanting.

129. *Anoetangium*. Capsule lateral, not striate; peristome none.

Fam. 28. *Meeseaceæ*.

I. *Meeseæ*. Capsule asymmetric, terminal; peristome double.

A. Leaves mamilllose. Peristomial teeth long.

130. *Paludella*. Leaves sheathing, deflexed when moist.

B. Leaves not mamilllose. Peristomial teeth (exc. *Plagiobryum Zierii*) shorter than the endostome.

a. Upper leaf-cells small, subquadrate. Stem mostly high.

131. *Meesea*. Pedicel of the capsule long. Leaves not appressed when dry.

b. Upper leaf-cells large, rhombic-polygonal. Stem low.

132. *Amblyodon*. Calyptra inflate. Male flowers with claviform paraphyses. Pedicel of the capsule long. Leaves not appressed when dry.

133. *Plagiobryum*. Calyptra not inflate. Paraphyses filiform. Pedicel of the capsule short. Leaves appressed when dry.

II. *Mielichhoferiæ*. Capsule symmetric, usually lateral; exostome or endostome mostly rudimentary.

134. *Mielichhoferia*. Leaves very small, imbricate

and appressed, not mamillose; cells subrectangular, the lower ones larger and subquadrate. Habit of *Bryum filiforme*. Dioecious.

III. *Orthodontieæ*. Capsule symmetric, terminal, with a long and narrow neck; endostomial segments ciliiform without distinct basilar membrane; teeth much longer.

135. *Orthodontium*. Leaves setiform; cells subrectangular. Stem low.

Fam. 29. *Cinclidiaceæ* (new fam).

136. *Cinclidium*. Peristomial teeth short. Leaves large and broad; cells large, round-hexagonal, often red.

Fam. 30. *Bartramiaceæ*.

I. *Bartramieæ*. Capsule (when operculate) subglobose; teeth not united above; lid not rostrate. Leaves not appressed when moist, generally papillose (in *Bartramia Oederi*, *Anacolia Menziesii*, *Catoscopium* and *Bartramidula* smooth).

A. Capsule striate; segments usually present.

137. *Breutelina*. Leaves plicate, sheathing, squarrose, not recurved; cells rectangular. Male flowers discoid. Dioecious.

138. *Bartramia*. Leaves not plicate, often sheathing, not rarely recurved, long and uniform; cells rectangular (or the uppermost quadrate), the lower not more dilated. Monoecious or synoecious. Male flowers gemmiform.

139. *Philonotis*. Leaves sometimes plicate at the base, not sheathing, often recurved, mostly diversiform; cells rectangular, the lower more dilated. Monoecious or dioecious. Male flowers discoid or gemmiform.

B. Capsule not striate; segments wanting.

a. Capsule without distinct neck. Leaves serrulate. Habit of *Philonotis*.

140. *Anacolia*. Pedicel of the capsule sublateral, not or slightly curved. Peristomial teeth sometimes pre-

sent. Leaves recurved, plicate below. Dioecious. Male flowers gemmiform.

141. *Bartramidula*. Pedicel of the capsule terminal, curved. Peristome none. Leaves neither recurved nor plicate. Synoecious.

b. Capsule with distinct neck. Leaves entire.

142. *Catoscopium*. Capsule terminal, very small; teeth present; pedicel straight. Leaves not plicate. Dioecious.

II. *Conostomeæ*. Capsule suboval; teeth united above; lid rostrate. Leaves appressed also when moist, very rigid.

143. *Conostomum*. Leaves 5-farious, not sheathing, nearly smooth, very short. Capsule striate; endostome wanting. Tufts glaucous green. Dioecious.

Fam. 31. *Funariaceæ*.

I. *Funariæ*. Leaves costate. Prothallium not persistent.

144. *Funaria*. Capsule exserted, often asymmetric; peristome double or simple; calyptra cucullate.

145. *Physcomitrium*. Capsule symmetric, mostly exserted; peristome wanting or (in one species) simple; calyptra mitriform, plurilobate at base.

146. *Pyramidula*. Capsule symmetric, slightly exserted; peristome wanting; calyptra tetragonal, contracted below the capsule. Plants very small.

II. *Disceliæ*. Leaves nerveless. Prothallium persistent.

147. *Discelium*. Capsule asymmetric, subglobose, long-exserted; peristome simple. Stem nearly indistinct. Leaves very small.

Fam. 32. *Bryaceæ*.

A. Stem tree-like, regularly branching above.

I. *Leucolepideæ*. Leaves smooth. Capsule terminal.

148. *Leucolepis*. Stem-leaves (principally above) with elongate cells; branch-leaves with round-polygonal, small cells. Capsule symmetric; endostome orange; cilia not appendiculate. Habit of *Thamnium*.

B. Stem not tree-like.

a. Capsule lateral.

II. *Rhizogonieæ*. Capsule asymmetric and curved.

149. *Rhizogonium*. Leaves smooth, setiform; upper cells small and rotundate, the basal ones subquadrate.

b. Capsule terminal.

aa. Leaves sheathing; upper cells usually papillose.

III. *Timmieæ*. Capsule symmetric. Leaf-cells small, round-hexagonal.

150. *Timmia*. Capsule not striate. Habit of *Polytrichum*.

bb. Leaves not sheathing, smooth or (in some species of *Aulacomnium*) papillose above.

IV. *Aulacomnieæ*. Leaves usually papillose; cells small, generally rotundate. Capsule often asymmetric, usually striate when dry.

151. *Aulacomnium*. Stem often with pseudopodia (sterile gemmiform shoots).

V. *Mnieæ*. Leaves smooth; cells polygonal, mostly large. Capsules generally symmetric, not striate, often clustered. Subterranean stem generally rhizomatic, often stoloniferous. Lowest leaves mostly squamiform. Tufts generally loose.

152. *Mnium*. Capsules symmetric, often clustered; endostome orange; cilia not or indistinctly appendiculate. Leaves serrate or entire; cells nearly uniform, generally round-hexagonal, in one species suboval-oblong. Paraphyses claviform.

153. *Roellia* (new genus). Capsule symmetric, solitary; endostome hyaline; cilia not appendiculate. Leaves serrate; cells diversiform, mostly oblong-lanceolate or the uppermost oblong-oval. Male flowers unknown.

154. *Rhodobryum*. Capsules more or less asymme-

tric, often clustered; endostome orange; cilia long-appendiculate. Leaves serrate; cells diversiform, mostly narrow, the lower long-rectangular, the uppermost oblong-oval or hexagonal. Paraphyses filiform.

VI. *Bryce*. Leaves smooth; cells polygonal, mostly not large. Capsule solitary, not striate. Stem neither rhizomatic nor stoloniferous. Lower leaves not squamiform. Tufts generally dense.

155. *Bryum*. Capsule symmetric or (less often) asymmetric; endostome generally pale or pale-yellow; cilia often appendiculate. Leaves often entire; cells diversiform, the lower (or all) more or less elongate, the upper seldom round-hexagonal. Paraphyses filiform.

156. *Leptotheca*. Capsule symmetric; teeth very long and narrow.

Fam. 33. *Buxbaumiaceæ*.

157. *Buxbaumia*. Capsule pedicellate; peristome double. Leaves nerveless, nearly indistinct.

158. *Diphygium*. Capsule immersed; exostome none. Leaves costate, diversiform; the perichetial large.

Fam. 34. *Andreæaceæ*.

159. *Andreæa*. Leaves usually blackish or brownish when dry. Tufts loosely cohering. Growing on rocks, sometimes in running water.

Fam. 35. *Bruchiaceæ*.

I. *Bruchieæ*. Stem distinct. Leaves costate, smooth or (sometimes in *Bruchia*) obsoletely papillose.

A. Capsule pedicellate, neck often distinct. Spores 0.02—0.04 mm. Prothallium seldom persistent.

160. *Bruchia*. Capsule often exserted; columella persistent. Calyptra mostly campanulate, sometimes split at one side. Leaves usually crowded.

161. *Pleuridium*. Capsule usually immersed, mostly ovoid; columella usually persistent. Calyptra mostly subcucullate. Leaves usually distant.

B. Capsule not pedicellate, without neck. Spores very large, $0.1-0.3$ mm. Prothallium not persistent.

162. *Archidium*. Capsule globose; columella wanting. Calyptra rudimentary or irregularly splitting. Leaves often distant.

II. *Ephemereæ*. Stem wanting or indistinct. Leaves often nerveless, smooth or (seldom) papillose-spinulose. Capsule globose without neck, immersed. Prothallium persistent. Plants minute.

A. Leaves smooth.

163. *Ephemerum*. Capsule not or indistinctly pedicellate; columella rudimentary or complete, more or less fugacious. Calyptra campanulate or (in one species) subcucullate. Leaves often nerveless. Spores $0.02-0.08$ mm. Prothallium abundant. Dioecious.

164. *Nanomitrium*. Capsule not pedicellate, columella wanting. Calyptra campanulate-mitriform, very small. Leaves nerveless. Spores about 0.03 mm. Prothallium not abundant. Paroecious.

B. Leaves papillose-spinulose on both sides and on the costa.

165. *Ephemeridium* (new genus). Capsule indistinctly pedicellate; columella wanting. Calyptra campanulate, somewhat large. Spores 0.02 mm or larger. Prothallium not abundant. Dioecious.

Fam. 36. Voitiaceæ.

166. *Voitia*. Capsule oval-oblong or globose.

Fam. 37. Physcomitrellaceæ.

167. *Physcomitrella*. Capsule subglobose, irregularly splitting. Calyptra split or faintly crenulate at base, scarcely covering the point of the capsule.

168. *Aphanorhegma*. Capsule globose or oval, regularly and horizontally splitting. Calyptra lobulate, covering more than the point of the capsule.

Fam. 38. *Phascaceæ*

169. *Phascum*. Capsule apiculate, rostellate, mamillate or muticous. Calyptra mitriform or cucullate. Leaves generally reflexed at the borders, seldom involute; costa usually excurrent.

European genera, not hitherto found in N. America, are: *Daltonia*, *Oreas*, *Bartramidula*, *Breutelia*, *Trochobryum*, *Geheebia*, *Orthodontium*.



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